



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/574,758

06/20/2008

Aviram Tam

40006317-0087-002

2213

7590

01/26/2011

Patent Counsel  
Applied Materials , INC.  
P.O. BOX 450A  
SantaClara, CA 95052

EXAMINER

BERMAN, JACK I

ART UNIT

PAPER NUMBER

2881

MAIL DATE

DELIVERY MODE

01/26/2011

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/574,758	<b>Applicant(s)</b> TAM, AVIRAM	
	<b>Examiner</b> Jack I. Berman	<b>Art Unit</b> 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 November 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,4-10,12,13,16-23 and 26-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4-10,12,13,16-23 and 26-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/11/10</u> .  | 6) <input type="checkbox"/> Other: _____                          |

Art Unit: 2881

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, 4-6, 9, 13, 16-18, 21, 22, and 26-28 are rejected under 35 U.S.C. 102(a) as being anticipated by Mitsui (U. S. Patent Application Publication No. 2003/0059104). Mitsui discloses a method, comprising: receiving, by a measurement system, a measurement model that comprises measurement image information (paragraph [0041], if the “pattern edge model is previously produced”, then it must inherently somehow be received by the measurement system, i.e. the SEM); locating, by the measurement system, a target measurement area of a sample by utilizing the measurement image information (paragraph [0043]); locating, by the measurement system, edges of structural features within the target measurement area by searching in a proximity of reference edges defined in the edge information (paragraphs [0043]-[0044]); performing, by the measurement system, at least one measurement of the target measurement area based on the located edges of the structural features; and providing, by the measurement system, measurement result information to the user (paragraph [0047]), as claimed in claim 1. At paragraphs [0006] and [0007], Mitsui teaches that the method is used with a measurement system comprising: a scanner (which must inherently be in communication with a processor since all SEMs have such processors as no human operator could control the charged particle beam in the manner or interpret the electrical signals arising from the interaction of the charged particles with the sample) that is enabled to scan a target measurement area with a beam of charged particles; a detector (also in communication with the processor, by the same reasoning

Art Unit: 2881

used with respect to the scanner), positioned to receive charged particles resulting from an interaction between the target measurement area and the beam of charged particles and to provide multiple detection signals, based on the received charged particles to the processor; and a processor that must inherently be enabled, because it must perform these functions, to generate or receive a measurement model comprising measurement image information and edge information (paragraph [0041]), locate a target measurement area of a sample utilizing the measurement image information (paragraph [0043]), locate edges of structural features within the target measurement area by searching in a proximity of reference edges defined in the edge information (paragraphs [0043]-[0044]), perform at least one measurement of the target measurement area based on the located edges of the structural features (paragraph [0047]), control a scanner, and process multiple detection signals received from a detector, as claimed in claims 13 and 21. As Mitsui explains in paragraph [0047], the measurement mode comprises and is responsive to edge and measurement information, as claimed in claims 4, 5, 16-17, and 26-27, and involves the measurement of at least one feature (line pattern P2), as is claimed in claims 6, 18, and 28. At paragraph [0042], Mitsui teaches that the method comprises generating measurement image information from an SEM image, as claimed in claims 9 and 22.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7, 12, 19, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsui in view of Lee et al. (U. S. Patent Application Publication No. 2002/0110278). Lee et al.

Art Unit: 2881

discloses a measurement method utilizing measurement model information (structure-guided measurement method), as discussed at paragraphs [0017]-[0019] in the reference, and teaches at paragraphs [0030], [0059], and [0065] that the measurement method should comprise measuring a relationship between multiple structural elements within the measurement area, as claimed in claims 7, 19, and 29. At paragraphs [0031] and, as an example, paragraph [0139], Lee et al. teaches to repeat a stage of generating a measurement model until one or more criteria are fulfilled, as claimed in claim 12. It would have been obvious to a person having ordinary skill in the art to use the Lee et al. as the measurement method required by the Mitsui evaluation method in order to achieve the increased accuracy discussed by Lee et al.

Claims 8, 20, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsui in view of Oh et al. (U. S. Patent Application Publication No. 2003/0086616). At paragraphs [0020] and [0094]-[0120], Oh et al. teaches that locating of an area of interest during a semiconductor manufacturing process can be achieved by applying image processing. Since the Mitsui method is described as being for use in evaluating semiconductors, it would have been obvious to a person having ordinary skill in the art to locate a measurement area required for the evaluation process by applying image processing in the manner taught by Oh et al., as claimed in claims 8, 20, and 30. It would also have been obvious to a person having ordinary skill in the art to accelerate the locating process by first locating a vicinity area that comprises the measurement area so that the image processing step is only performed in an area known to contain the measurement area. It is common sense to only perform a detailed search for a particular area, such as the search performed by image processing, in a vicinity area where there is the possibility of finding that area.

Art Unit: 2881

Claims 10 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsui in view of Saito (U. S. Patent Application Publication No. 2003/0126566). At paragraphs [0070] and [0071], Saito teaches to use CAD information to generate measurement image (reference image) information for purposes of evaluating a semiconductor device in a scanning electron microscope (SEM) that comprises a scanner (deflector 36) for scanning an measurement area with a beam of charged particles (electron beam EB); a detector (41), positioned to receive charged particles resulting from an interaction between the measurement area and the beam of charged particles and to provide multiple detection signals; and a processor (central processing unit 32) adapted to process detection signals and to control the scanner. It would have been obvious to a person having ordinary skill in the art to use Saito's measurement image generated by CAD information as the pattern edge model referred to at paragraph [0041] in Mitsui since the Mitsui and Saito methods are both disclosed as methods for measuring features on semiconductor devices in SEMs and Mitsui only mentions that the pattern edge model is "previously produced" without explaining how it is produced.

Applicant's arguments filed November 11, 2010 have been fully considered but they are not persuasive. Applicant's sole argument is that:

"Mitsui fails to teach or suggest 'locating, by the measurement system, edges of structural features within the target measurement area by searching in a proximity of reference edges defined in the edge information'. In contrast, Mitsui locates an edge of a structural feature by searching along the entire width of the structural feature (i.e., DSI and DS2 arrows in figure 5A) or searching along half the width of the structural feature (i.e., DS5 and DS6 arrows in figure 5B), with no consideration of searching in a proximity of reference edges."

However, in paragraph [0043], Mitsui teaches:

At this time, with respect to a pixel in which an edge may exist, the processing range for the image matching is preferably restricted on the basis of

Art Unit: 2881

the intensity value of the pixel, the dispersion value thereof, the matching score with the reference image, and any other value calculated by all image processing capable of being defined for every pixel, to shorten the processing time.

And in paragraph [0044], Mitsui teaches:

Referring to FIGS. 6A through 6E, the details of a method for an image matching process will be described below. FIGS. 6A through 6E are conceptual drawings wherein the intensity of pixels in an image for measurement and an edge portion of a pattern edge model is taken in Y-axis direction. First, as shown in FIG. 6A, a correlation to a portion of an object image corresponding to the pattern edge model is calculated for every pixel, to plot correlation values  $V_{CR}$ . As shown in FIG. 6B, the correlation values  $V_{CR}$  increase as the pattern edge model approaches the edge of a pattern to be evaluated by scanning the object image with the reference image. These operations are carried out over all of the regions assigned by the ROI [Region of Interest] in the image for measurement, or in the processing region restricted by the above described pixel value. [Emphasis supplied]

Therefore, contrary to applicant's assertions, Mitsui does teach "locating, by the measurement system, edges of structural features within the target measurement area by searching in a proximity of reference edges defined in the edge information".

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

Art Unit: 2881

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack I. Berman whose telephone number is (571) 272-2468. The examiner can normally be reached on Monday-Thursday (8:30-7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jack I. Berman/  
Primary Examiner, Art Unit 2881

jb  
1/24/11